APPENDIX B RECREATION OPPORTUNITY SPECTRUM (ROS)

Introduction and Protocol

Appendix B, Recreation Opportunity Spectrum (ROS), summarizes the Recreation Opportunity Spectrum Inventory for the Green Mountain National Forest (GMNF). ROS has been used as a framework for identifying, classifying, planning, and managing a range of recreation settings. Six distinct settings: urban, rural, roaded natural, semi-primitive motorized, semi-primitive non-motorized, and primitive are defined using specific physical, managerial, and social criteria. For detailed information on ROS categories and criteria refer to the 'Recreation Opportunities and Forest Settings' Section, Chapter 3, FEIS or the *ROS User Guide, 1982 USDA Handbook,* and the *ROS Primer and Field Guide, 1990 USDA, R6-REC-021-90.* For additional information on applications, refer to *Forest Service Manuals 2311* and *2330.*

Direction for the GMNF ROS inventory was interpreted from *National ROS Inventory Mapping Protocol* (12/2003). The protocol addresses the need and benefits of using ROS and stresses the importance for consistent definitions and methodologies for mapping a nationally recognized classification. The protocol includes general guidelines, inventory mapping steps, and supplemental material to assist in the ROS inventory. A key supplement provided with the protocol is an ARC Macro Language file, or AML. An AML is a proprietary high-level algorithmic language for generating end-user applications in ArcInfo Workstation. Utilizing the AML, the Geographic Information System (GIS) component of the ROS inventory is automated and standardized. It is important to note that the AML takes the ROS inventory through Step 8. Step 9 in the protocol states "resolve inconsistencies," and is not covered in the AML and the analysis. To complete Step 9, GMNF specialists need to review the ROS map products for site-specific inconsistencies.

Additional consideration, besides use of the AML, was accounted for during Step 6 (distinguishing between roaded natural, rural, and urban) and Step 8 (apply other criteria and local knowledge). To assist specialist review and further refine the GMNF ROS inventory process, a residential housing density analysis was performed for the State of Vermont. The results were used to define areas that exhibited rural or urban characteristics (Step 6). Although the density of only residential housing units (rhu) is one-dimensional, a correlation between where people reside and the ROS setting characteristics for rural and urban is positive. Rural was defined between 1 rhu/20 acres and 1 rhu/5 acres; urban was defined as greater than 1 rhu/5 acres. Alpine Ski Areas (MA 7.1) were considered as part of the inventory and were given a ROS category of rural.

GMNF Data Sources

- **Better than primitive roads** – merged product of VTrans Master Road centerlines GIS layer *(TransRoad_RDS)* and GMNF system roads GIS layer *(travel_route_road)*.
    - *TransRoad_RDS* selected set includes:
        - Regional Planning Commission Class (RPCCLASS) attribute code 1-3,5,11-59,92-93,95,99
        - Class 4 town highways (RPCCLASS=4) **NOT** with function class rural, local (FUNCL=9) or having hard surface (pavement) or gravel surface type (SURFACE=1 or 2)
        - Private roads (RPCCLASS=8 or 9) with hard surface (pavement) or gravel surface type (SURFACE=1 or 2)
    - *Travel_route_road* selected set includes*:*
        - All roads with an operational maintenance level (OML) 3-5 and OML 2 NOT with local function classification and native material surface type

- **Primitive roads –** merged product of VTrans Master Road centerlines GIS layer *(TransRoad_RDS)* and GMNF system roads GIS layer *(travel_route_road)*.
    - *TransRoad_RDS* selected set includes:
        - Class 4 town highways (RPCCLASS=4) with function class rural, local (FUNCL=9) and **NOT** having hard surface (pavement) or gravel surface type (SURFACE=1 or 2)
        - Private roads (RPCCLASS=8 or 9) with hard surface (pavement) or gravel surface type (SURFACE=1 or 2)
    - *Travel_route_road* selected set includes*:*
        - All roads with an operational maintenance level (OML) 1 and OML 2 with local function classification and native material surface type

- **Motorized trails** – merged product of GMNF system trails *(travel_route_trail)* and VT Agency of Natural Resources *(TourismTrails_Trails)*.
    - *TourismTrails_Trails* selected set includes all Vermont Association of Snow Travelers (VAST) trails (VAST, VAST_1, VAST_2, VAFD=T); removed trail segments that intersected GMNF land
    - *Travel_route_trail* selected set includes all trails managed for snowmobile use (MANAGED_USE=SNOMO-SNOWMOBILE)

- **Railroads –** product of VTrans *(TransRail_RR)*. Selected set includes only active rail lines (RRACTIVE=YES)

- **Motorized lakes –** extracted lakes from RF scale 100,000 digital line graph layer titled *WaterHydro_DLGLAKE* and selected lakes that were listed in VT Fish & Wildlife Department's *Fish Vermont: Official Map & Guide*, with access coded 'boats on trailer.' Lakes that were coded 'motors prohibited' were not included.

- **Residential Housing Units –** extracted from VT's Enhanced 9-1-1 Board GIS layer called *EmergencyE911_ESITE.* Selected set included all residential house records (TYPE=R*). Density analysis parameters: no population field, kernel type, search radius 1609.344 m, area unit's mi^2, cell size 60m.

GMNF Results

The results of the ROS inventory exercise are presented in Table B-1 and Table B-2 below. Table B-1 shows the ROS category results for all lands inside the GMNF's Proclamation Boundary, regardless of ownership. Table B-2 shows the results for only public lands within the Proclamation Boundary set aside as the GMNF. Maps of the ROS inventory are presented in Figure B-1 and B-2 for the GMNF within the Proclamation Boundary.

Table B-1: Recreation Opportunity Spectrum Inventory for all lands within the Proclamation Boundary

ROS Winter	***Hectares***	***Acres***	***Percent in GMNF Proclamation Boundary***
Urban (*Highly Developed*[1])	10,238	25,298	3%
Rural *(Developed Natural*[1]*)*	47,863	118,272	14%
Roaded Natural *(Semi-developed Natural*[1]*)*	158,564	391,818	48%
Semi-primitive Motorized	50,363	124,450	15%
Semi-primitive Non-motorized	64,971	160,545	20%
Primitive	0	0	0%
total	331,998	820,382	100%

Table B-2: Recreation Opportunity Spectrum Inventory for the Green Mountain National Forest within the Proclamation Boundary

ROS Winter	***Hectares***	***Acres***	***Percent in GMNF Proclamation Boundary***
Urban (*Highly Developed*[1])	83	206	0%
Rural *(Developed Natural*[1]*)*	4,674	11,548	3%
Roaded Natural *(Semi-developed Natural*[1]*)*	63,989	158,120	40%
Semi-primitive Motorized	42,376	104,713	27%
Semi-primitive Non-motorized	46,994	116,123	30%
Primitive	0	0	0%
total	158,116	390,710	100%

[1]ROS category titles extended to include both Federal and State land planning in the Northeast, using Vermont as an example. For further information reference:
Forest Service Publication*:* GTR-NE-309*, Extending the Recreation Opportunity Spectrum to Non-Federal Lands in the Northeast: an Implementation Guide*, S. Bulmer et al, 2001.

Literature Cited

U.S. Department of Agriculture, Forest Service. 1982. 1982 ROS User Guide.

U.S. Department of Agriculture, Forest Service. 1990. ROS Primer and Field Guide, R6-REC-021-90.

U.S. Department of Agriculture, Forest Service. December, 2003. National ROS Inventory Mapping Protocol.